

Book review

Introduction to Wave Scattering, Localization, and Mesoscopic Phenomena, P. Sheng. Springer, Berlin (2006). (xv + 333pp., US\$ 179, Hardbound, ISBN: 978-3-540-29155-8).

This title was published as volume 88 of the Springer series “Material Science” and is a revised edition of the book published under the same title in 1995 by Academic Press. The main objective of this monograph is to give a broad and systematic overview of the discipline of wave propagation in disordered media using as a framework the following four phenomena/concepts: effective medium, wave diffusion, wave localization, and intensity fluctuations and correlations. This overall objective is largely achieved.

The first edition of the book has been used as a standard reference and has been cited more than 400 times in the publications covered by Thomson Scientific’s Science Citation Index ExpandedTM and more than 440 times in the publications included in the SCOPUS database. The book went out of print several years ago and since then has been almost impossible to find in traditional and on-line bookstores. This factor alone makes the second edition of the book quite worthwhile.

Typically, one would expect the second edition to include a substantial amount of new material describing the significant developments in this area of physics that have occurred in the past 11 years. However, the author had opted to make only a handful of relatively minor changes thus preserving the core of the book largely intact. This appears to be justified as long as one uses the book mostly as a nice graduate-level text characterized by clear exposition and equipped with a large number of instructive problems with solutions.

Nevertheless, the very fact that only six new references have been included in the second edition implies that one should not expect to find a detailed account of the most recent results. From my personal perspective, another limitation of the book is the deliberate neglect of the vector nature of electromagnetic waves. This approach leaves out the entire spectrum of polarization phenomena most of which have a profound effect on wave propagation and localization in random media.

Despite the above-mentioned limitations, this book will be a valuable addition to university and research libraries and a useful tool for graduate students and researchers dealing with wave propagation in disordered media. I fully expect it to remain a standard reference and a standard graduate-level textbook for years to come. The polygraphic quality of the book is exemplary.

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